

WHAT IS CLAIMED IS:

1        1.     A method for processing operations in a system including a bus, a  
2     target device and devices capable of accessing the target device over the bus, wherein  
3     the target device performs:

4            receiving a transaction request from one of the devices over the bus;  
5            determining whether a delayed read request is pending after receiving the  
6     transaction request;

7            issuing a command to disconnect the device initiating the transaction request  
8     from the bus; and

9            allowing the device initiating the transaction request to reconnect to the bus  
10    and complete the transaction request after the delayed read request is completed.

1        2.     The method of claim 1, wherein the delayed read request is directed  
2     toward a first memory region and the transaction request comprises an Input/Output  
3     request directed toward a second memory region.

1        3.     The method of claim 1, wherein the first and second memory regions  
2     are implemented within the target device.

1        4.     The method of claim 1, wherein the command to disconnect comprises  
2     a retry disconnect that occurs before data subject to the transaction request is  
3     transmitted.

1        5.     The method of claim 1, further comprising:  
2            determining whether requested data for the delayed read request is available  
3     to return, wherein the command to disconnect the device initiating the transaction  
4     request is issued after the requested data for the delayed read request is determined to  
5     be available to return.

1       6.     The method of claim 5, further comprising:  
2       allowing the transaction request to proceed if the delayed read request is  
3     pending and if the requested data for the delayed read request is not available to  
4     return.

1       7.     The method of claim 6, further comprising:  
2       after allowing the transaction request to proceed, determining that all the  
3     requested data is available to return, wherein the command to disconnect is issued  
4     after determining that all the requested data is available to return after allowing the  
5     transaction request to proceed.

1       8.     The method of claim 7, wherein the transaction request will attempt to  
2     reconnect to the target device to complete an unfinished portion of the transaction  
3     request that did not complete as a result of the issuing of the command to disconnect.

1       9.     The method of claim 8, wherein the transaction request comprises a  
2     write request, wherein the target device receives write data while the delayed read  
3     request is pending and the requested data is not available to return, wherein the  
4     device issuing the write request will transmit that portion of the write data not sent as  
5     a result of the issuing of the command to disconnect during a subsequent reconnect to  
6     the target device.

1       10.    The method of claim 1, wherein the bus, target device, and devices  
2     communicate using the Peripheral Component Interconnect (PCI) protocol, and  
3     wherein the devices that initiate the delayed read request and transaction request  
4     comprise master devices for the bus.

1       11.    The method of claim 1, further comprising;  
2       determining whether a variable indicates a first state or a second state,  
3     wherein the state indicated by the variable determines when the target device issues

4 the command to disconnect the device initiating the transaction request while the  
5 delayed read request is pending.

1           12.    The method of claim 11, further comprising:  
2           issuing the command to disconnect the device initiating the transaction  
3 request when the device that initiated the delayed read request attempts to reconnect  
4 to the target device if the variable indicates the first state; and  
5           issuing the command to disconnect the device initiating the transaction  
6 request after all the requested data for the delayed read request is determined to be  
7 available to return if the variable indicates the second state.

1           13.    The method of claim 12, further comprising:  
2           allowing the transaction request to proceed during a time at which all the  
3 requested data for the delayed read request is not available to return if the variable  
4 indicates the second state.

1           14.    The method of claim 1, wherein transaction request and delayed read  
2 request are initiated from different devices.

1           15.    A system for processing operations in communication with devices,  
2 comprising:  
3           a target device;  
4           a bus, wherein the devices are capable of accessing the target device over the  
5 bus;  
6           means for receiving a transaction request from one of the devices over the  
7 bus;  
8           means for determining whether a delayed read request is pending after  
9 receiving the transaction request;  
10          means for issuing a command to disconnect the device initiating the  
11 transaction request from the bus; and

12 means for allowing the device initiating the transaction request to reconnect to  
13 the bus and complete the transaction request after the delayed read request is  
14 completed.

1 16. The system of claim 15, further comprising:  
2 a first memory region; and  
3 a second memory region, wherein the delayed read request is directed toward  
4 the first memory region and the transaction request comprises an Input/Output  
5 request directed toward the second memory region.

1 17. The system of claim 15, further comprising:  
2 means for determining whether requested data for the delayed read request is  
3 available to return, wherein the command to disconnect the device initiating the  
4 transaction request is issued after the requested data for the delayed read request is  
5 determined to be available to return.

1 18. The system of claim 17, further comprising:  
2 means for allowing the transaction request to proceed if the delayed read  
3 request is pending and if the requested data for the delayed read request is not  
4 available to return.

1 19. The system of claim 18, further comprising:  
2 means for determining that all the requested data is available to return after  
3 allowing the transaction request to proceed, wherein the command to disconnect is  
4 issued after determining that all the requested data is available to return after allowing  
5 the transaction request to proceed.

1 20. The system of claim 19, wherein the transaction request will attempt to  
2 reconnect to the target device to complete an unfinished portion of the transaction  
3 request that did not complete as a result of the issuing of the command to disconnect.

2025 RELEASE UNDER E.O. 14176

1        21.    The system of claim 15, wherein the bus, target device, and devices  
2 communicate using the Peripheral Component Interconnect (PCI) protocol.

1        22.    The system of claim 15, further comprising:  
2            means for determining whether a variable indicates a first state or a second  
3 state, wherein the state indicated by the variable determines when the target device  
4 issues the command to disconnect the device initiating the transaction request while  
5 the delayed read request is pending.

1        23.    An article of manufacture including code for processing operations in  
2 a system including a bus, a target device and devices capable of accessing the target  
3 device over the bus, wherein the code causes the target device to perform:  
4            receiving a transaction request from one of the devices over the bus;  
5            determining whether a delayed read request is pending after receiving the  
6 transaction request;  
7            issuing a command to disconnect the device initiating the transaction request  
8 from the bus; and  
9            allowing the device initiating the transaction request to reconnect to the bus  
10 and complete the transaction request after the delayed read request is completed.

1        24.    The article of manufacture of claim 23, wherein the delayed read  
2 request is directed toward a first memory region and the transaction request  
3 comprises an Input/Output request directed toward a second memory region.

1        25.    The article of manufacture of claim 23, wherein the first and second  
2 memory regions are implemented within the target device.

1        26.    The article of manufacture of claim 23, wherein the command to  
2 disconnect comprises a retry disconnect that occurs before data subject to the  
3 transaction request is transmitted.

1        27.    The article of manufacture of claim 23, further comprising:  
2            determining whether requested data for the delayed read request is available  
3            to return, wherein the command to disconnect the device initiating the transaction  
4            request is issued after the requested data for the delayed read request is determined to  
5            be available to return.

1        28.    The article of manufacture of claim 27, further comprising:  
2            allowing the transaction request to proceed if the delayed read request is  
3            pending and if the requested data for the delayed read request is not available to  
4            return.

1        29.    The article of manufacture of claim 28, further comprising:  
2            after allowing the transaction request to proceed, determining that all the  
3            requested data is available to return, wherein the command to disconnect is issued  
4            after determining that all the requested data is available to return after allowing the  
5            transaction request to proceed.

1        30.    The article of manufacture of claim 29, wherein the transaction request  
2            will attempt to reconnect to the target device to complete an unfinished portion of the  
3            transaction request that did not complete as a result of the issuing of the command to  
4            disconnect.

1        31.    The article of manufacture of claim 30, wherein the transaction request  
2            comprises a write request, wherein the target device receives write data while the  
3            delayed read request is pending and the requested data is not available to return,  
4            wherein the device issuing the write request will transmit that portion of the write  
5            data not sent as a result of the issuing of the command to disconnect during a  
6            subsequent reconnect to the target device.

1        32.    The article of manufacture of claim 23, wherein the bus, target device,  
2            and devices communicate using the Peripheral Component Interconnect (PCI)

3 protocol, and wherein the devices that initiate the delayed read request and  
4 transaction request comprise master devices for the bus.

1           33.    The article of manufacture of claim 23, further comprising;  
2           determining whether a variable indicates a first state or a second state,  
3 wherein the state indicated by the variable determines when the target device issues  
4 the command to disconnect the device initiating the transaction request while the  
5 delayed read request is pending.

1           34.    The article of manufacture of claim 33, further comprising:  
2           issuing the command to disconnect the device initiating the transaction  
3 request when the device that initiated the delayed read request attempts to reconnect  
4 to the target device if the variable indicates the first state; and  
5           issuing the command to disconnect the device initiating the transaction  
6 request after all the requested data for the delayed read request is determined to be  
7 available to return if the variable indicates the second state.

1           35.    The article of manufacture of claim 34, further comprising:  
2           allowing the transaction request to proceed during a time at which all the  
3 requested data for the delayed read request is not available to return if the variable  
4 indicates the second state.

1           36.    The article of manufacture of claim 23, wherein transaction request  
2 and delayed read request are initiated from different devices.